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ABSTRACT

Virtually no research conducted on women and mathematics is longitudinal in scope, generalizable in extent, and ethnic-race specific in nature. This descriptive study begins to fill the gap by examining the effects of background, school, and social-psychological factors on Hispanic, black, and white women's mathematics attainments. Data for the study are taken from the National Longitudinal Study of the High School Class of 1972 (NLS) with follow-ups in 1973, 1974, and 1976. Results of descriptive analyses show differences in factors affecting white and racial minority women with respect to their decision to pursue mathematics-related fields of study. The 10 sets of variables considered included: (1) family background: (2) high school experience: (3) self-concept: (4) significant others' perceived influence on college plans: (5) expectations: (6) expected college majors: (7) college mathematics experience: (8) sex-role orientation: (9) family status: and (10) mathematics-related attainment. (Author/RL)

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# Factors Related to White, Black, and Hispanic Women's Mathematics Attainments: A Descriptive Study

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Factors Related to White, Black, and Hispanic

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## Abstract

Virtually no research conducted on women and mathematics is longitudinal in scope, generalizable in extent, and ethnic-race specific in nature. This descriptive study begins to fill the gap by examining the effects of background, school, and social-psychological factors on Hispanic, black, and white women's mathematics attainments. Data for the study are taken from the National Longitudinal Study of the High School Class of 1972 (NLS) with follow-ups in 1973, 1974, and 1976. Results of descriptive analyses show differences in factors affecting white and racial minority women with respect to their decision to pursue mathematics-related fields of study.

Although the proportion of women in the labor force exceeds 50 percent, the latest figures show that women earn only three-fifths as much as men (Norwood & Waldman, 1979). One factor which accounts for this salary differential is the types of jobs held by women; occupations which most need mathematics training, for example, are those with the least sex differentiation in pay (Boswell, 1979; National Science Foundation, 1978). However, for the most part, women are still employed in traditionally female occupations (Oppenheimer, 1975; Reynolds, 1980) which require little or no mathematics. Rossi (1965), trying to determine whether women were making gains in engineering, medicine, and science, found no appreciable increase, from 1961 to 1965, in the number of women in these fields. More recent data (Bureau of Labor Statistics, 1979) indicate that 67 percent of the women are employed in occupational categories of nursing, sales, secretarial, and teaching.

Theoretical Framework

The impetus for discovering reasons why women did not participate in more prestigious and mathematics-related fields was Sells' (1973) report that 92 percent of the first year Berkeley college women could not meet the requirements to pursue advanced fields of study requiring mathematics, thus denying them access to occupational categories such as mathematicians, engineers, physical and biological scientists, dentists, and architects.

Many studies of a cross-sectional nature have dealt with the identification of factors related to high school women's participation and achievement in mathematics (Armstrong, 1980; Boswell, 1979; Brush, 1979; Parsons, 1979; Stallings, 1979), while other newly reported longitudinal studies have been concerned with women's post-high school math experiences

and their relation to high school factors (Melone, 1980; Peng & Jaffe, 1979; Polachek, 1978; Steel & Wise, 1979; Wise, 1979). Two of these later studies in particular are important because they helped in the formulation of the model for the present research. Peng and Jaffe (1979), considering male-dominated fields, found that the most important predictor of women's entry into the male-dominated fields was the number of high school science courses taken. Also important were mathematics ability, the number of high school mathematics courses taken, and the women's educational expectations. Family background variables related indirectly to choice of college major through academic high school curriculum and educational plans. Steel and Wise (1979) constructed models for 12th-grade mathematics achievement and mathematics level of actual occupation at age 29, and found that the characteristics of women entering mathematics-related careers were early mathematics career plans, high educational attainment, completion of a mathematics-related college major, and high mathematics achievement scores. These scores were predicted in turn by the number of high school math courses taken which itself was a function of ninth grade math abilities, educational expectation, and interest in mathematics. Women's self-concept as well as the number of science courses, father's occupation and education, and the academic high school curriculum were also positively related to women's mathematics participation.

Objectives

This research is part of a larger study which examines the effects of various background, school, and social-psychological factors on women's attainment in mathematics-related fields. Ten classes of variables are considered in the model: family background, high school experience

(preparation and achievement), self-concept, significant others' perceived college influence, high school educational and occupational expectations, expected college major, college mathematics experience, sex-role orientation, family status, and 1976 mathematics-related attainment. The view is of a young woman initially affected by her background and high school experiences, but as she makes the transition from high school into the world of post-secondary school and work, her decision to pursue a mathematics-oriented field is further influenced by a variety of other factors. This paper presents, in particular, some of the descriptive findings.

Significance

This study fills a gap left by much of the research conducted on women and mathematics. With the increasing number of women in the job market and the depressing economic situation of this country, additional research is being directed at women and their involvement in mathematics training. No known recent study is longitudinal in scope, generalizable in extent, and ethnic-race specific in subjects (See Table 1).

This research is also helpful in providing information needed to help promote social and economic equity. It is essential that we understand what factors contribute to mathematics participation so that potentially successful intervention (particularly in the area of high school programs) may be undertaken to increase the influx of ethnic majority and minority women into mathematics-oriented fields of study and work.

This study makes a contribution on a more technical level, too. For relevant variables, this study uses a classification scheme devised by Steel and Wise (1979) which places a career or college major into one of

six levels, depending on the amount of mathematics knowledge needed. Since many variables are used in the analyses, more specific results can be disseminated to researchers, educators and policymakers.

The Data Base

The data for this study are a subsample drawn from the National Longitudinal Study of the High School Class of 1972 (NLS) and follow-ups in 1973, 1974, and 1976. This survey, sponsored by the National Center for Education Statistics, and conducted by the Educational Testing Service and the Research Triangle Institute, is a deeply stratified two-stage national probability sample of 22,652 seniors from 1,318 public and private schools in the 50 states and the District of Columbia (Levinsohn, Henderson, Riccobono, & Moore, 1978). The students were sampled with equal probabilities within schools, but to increase the representation of minorities, schools located in low-income areas and those with a high proportion of minority group enrollment were sampled at approximately twice the sampling rate for other schools.

This panel study is designed to provide data on the development of the educational, vocational, and personal aspects of the lives of adolescents as they make the transition from high school and possibly post-secondary school into the adult world.

In the spring of 1972, the base year, subjects completed responses to a 104-question student questionnaire (BY) concerning their family background, high school experiences, educational and occupational aspirations, and personal attitudes. Each student also completed a 69-minute Test Book (TB). The test battery, consisting of six tests and measuring both verbal and non-verbal ability, included one subtest providing a

measure of basic math competence. Additional baseline information about the students' high school recores was obtained from the 11-part Student's School Record Information Form (SRIF).

In the three follow-up surveys, further information was obtained about the respondents' educational and occupational careers, their aspirations, and attitudes. Collection of data for each survey consumed more than six months' time. The first follow-up survey (FFU) began in October 1973 and was completed in April 1974; the second follow-up (SFU) began in October 1974 and ended in April 1975; and the third follow-up (TFU) started in October 1976 and ended in May 1977. Response rates of 94.2 percent, 94.7 percent, and 92.1 percent, respectively, were obtained (King & Thorne, 1979).

The data from each instrument, along with several newly developed composites, were manually and machine edited and placed on four reels of tape. Thus, the master file of the third follow-up NLS data base contains 22,652 cases with 2,471 variables; a copy of it is presently stored on tape in Virginia Polytechnic Institute and State University's computer facility in Burrus Hall in Blacksburg, Virginia.

Sample

The NLS respondents chosen for this study are 6,384 white, 1,193 black, and 384 Hispanic women who responded to the 1972 base year survey. The Hispanics are an aggregate of 276 Mexican-Americans, 45 Puerto Ricans, and 63 Latin-Americans. Fennema (1980), who to date has done the most extensive research on sex differences in math achievement, has identified the racial factor as important to pursue.

Variable Measurement

Ten sets of variables are considered.

1. Family background. This category includes four variables: a) mother's education, b) father's education, c) mathematics level of father's occupation, and d) mother's occupation.

Information on parents' educational levels is provided by the respondents in several of the questionnaires and is a master file composite variable coded as 1 = less than high school, 2 = finished high school, 3 = some college, 4 = finished four-year college, and 5 = Master's or Ph.D.

Information on mother's occupation is provided by the respondent's choice of one of 14 possible base year responses "that best describes the work done" by the mother. This variable is then recoded as 2 = professional work, 1 = work, and 0 = otherwise.

2. High school experience. This category is divided into two subcategories: preparation and achievement. The preparation variables include a) the number of semesters of math taken in high school, b) the number of semesters of science taken in high school, and c) the student's high school curriculum (dichotomized as academic or not academic). The information for these three variables comes from the base year SRIF. The achievement variables are a) percentile class rank, and b) math ability score from the Test Battery.

3. Self-concept. Two variables are included in this category. One is the psychosocial 1972 self-concept measure. This composite was derived on the basis of factor analysis, from four base year items with five-point Likert scale response ranging from strongly agree to strongly disagree. The four items composing the self-concept measure are: 1) "I take a

positive attitude toward myself.", 2) "I feel I am a person of worth, on an equal plane with others.", 3) "I am able to do things as well as most other people.", and 4) "On the whole, I'm satisfied with myself."

The other variable is an academic self-concept measure, based on a response to the question "Whatever your plans, do you think you have the ability to complete college?"

4. Significant others' perceived influence on college plans. This category includes three influence variables, one each for parents, teachers/counselors, and peers.

The perceived parental college influence variable involves two base year questionnaire responses to: "As far as you know, how much schooling do your father and mother (or guardian) want you to get?" The variable is coded "3" if it is reported that both parents wanted the respondent to pursue at least a two-year college academic program, or if one parent was reported to want that and there was no report for the other parent. The variable is coded "2" if one parent wanted college and the other did not, and it is coded "1" if neither parent wanted at least a two-year college academic program for their child.

The perceived teacher/counselor college influence variable is a dichotomy, coded "1" for influence if the response to the base year question: "Have your teachers or counselors ever tried to influence your plans after high school?" was "encouraged me to go to college."

The dichotomous perceived peer college influence variable reflects the respondent's response to the question: "What do most of your close friends plan to do next year?" If the answer is: "go to college," it is considered to be a measure of peer influence and was accordingly coded

"1."

5. Expectations. There are two variables in this category: educational expectations and professional level of expected occupation.

The educaticnal expectation variable is the respondent's base year response to the question asking "the highest level of education you plan to attain." Answers range from 1 = less than high school graduation to 6 = go to a graduate or professional school after college.

The variable measuring the level of the respondent's expected occupation is derived from a base year questionnaire item asking the espondents to indicate "the best description of the kind of work you'd like to do." The occupational categories were then recoded in the same manner as described above for the mother's occupation variable.

6. Expected college major. The variable in this category, the math level of the expected college major, is recoded into six math level categories using a classification scheme devised by Steel and Wise (1979). This scheme involves placing a career or college major into one of six categories, depend[illegible]on the amount of math knowledge required. The classifications are: Level 6 (requires graduate level mathematics)--mathematician; Level 5 (generally requires advanced college mathematics)--engineer, physical scientist, architect, pilot; Level 4 (generally requires introductory college mathematics)--pharmacist, dentist, physician, biological scientist; Level 3 (requires college and may require some statistics)--forester, lawyer, college professor, engineering aide, medical/dental technician, accountant, high school teacher, elementary teacher, sociologist/psychologist, political scientist/economist, businessman, librarian, clergyman, writer, social worker; Level 2 (generally requires

some high school level mathematics)--nurse, salesperson, policeman/fireman, armed forces enlistedman, artist/entertainer, farmer, skilled worker, structural worker; Level 1 (generally requires little or no mathematics--secretary/office worker, barber/beautician.

7. College mathematics experience. The single variable in this category is the latest response (1976 to 1972) to the question asking the college major/field of study of the respondent. In other words, if the respondent has a 1976 field of study, this is the variable used; if s/he does not have a 1976 field of study, but does have one in 1975, this is used. The response is then recoded into the appropriate math level.

8. Sex-role orientation. The one variable in this category is a sex-role orientation measure. This composite is derived from 10 third follow-up items selected from 19 items used by other national studies. Responses to nine of the items ranged from 1 = agree strongly to 4 = disagree strongly (Peng & Jaffe, 1980). The nine items comprising this variable are: 1) "It is usually better for everyone involved if the man is the achiever outside the home and the woman takes care of the home and family.", 2) "Young men should be encouraged to take jobs that are usually filled by women (nursing, secretarial work, etc.).", 3) "Most women are just not interested in having big and important jobs.", 4) "Many qualified women can't get good jobs; men with the same skills have much less trouble.", 5) "Most women are happiest when they are making a home and caring for children.", 6) "High school counselors should urge young women to train for jobs which are now held mainly by men.", 7) "It is more important for a wife to help her husband than to have a career herself.",

8) "Schools teach women to want the less important jobs.", 9) "Men should be given first chance at most jobs because they have the primary responsibility for providing for a family."

9. Family status. Two dichotomous variables labeled marriage and children fall into this category and describe the respondents October 1976 marital status (1 = married, 0 = otherwise) and whether there are children in the family ( 1 = at least one child, 0 = no child).

10. Mathematics-related attainment. This last category contains two variables describing the mathematics level of respondent's 1976 college major and college degree.

Data Analyses

For the descriptive analysis presented in this paper, weighted frequency distributions, weighted means, and weighted (pairwise-deletion) correlation matrices were generated. The purpose of this analysis is to provide a preliminary profile of Hispanic, black and white academic women with respect to their family background, high school experiences, attitudes, expectations and mathematics-related participation as expressed by their college field of study.

Results

A look at the frequency distributions of the dependent variables is instructive in forming a profile for Hispanic, black, and white women. Tables 2-6 show weighted percentages for the expected college field of study, the declared 1972 and 1976 college fields of study, the declared field of study in which the BA degree was obtained, and the expected graduate school field of study. Table 7 indicates, for the three subgroups, the weighted percentages of those women in "math-related fields o

study" (i.e., fields of study with a math level of 4, 5, or 6).

Table 2, for example, shows that almost four-fifths of each group expect to have college majors leading to careers in fields which are not highly math related, such as lawyers, teachers, businessmen.

Of the women who did go to college in 1972 and who did declare a field of study (with the exception of black women), essentially the same percent of those people who said they would declare a math-related field of study did (7.2 percent vs. 7.9 percent for Hispanics, 11.0 percent vs. 10.3 percent for the whites). In the case of the black women, 14.1 percent expected to have a math-related field of study--a percent double that of the Hispanics and one quarter higher than the whites--while 11 percent--still the highest of all of the groups--actually declared such a major in 1972.

By 1976, however, white women declared math-related fields of studies almost twice as often as black women (13.7 percent and 7.3 percent, respectively), while Hispanic women were somewhere in between at 9.9 percent. (It should also be noted that the size of the group that responded to this 1976 college majors declaration decreased to less than half the 1972 group, with the greatest decrease (60 percent) occurring among white women.)

Of the 1090 women who declared their field of study of their BA degree, 12 are Hispanic, 105 are black, and 973 are white. None of the Hispanics received a BA with a math level of 5 or 6, but 25.1 percent did receive a math level 4 BA. The other two racial groups had their BA degree disciplines more spread out. Blacks received 6.3 percent of their degrees in math levels 5 or 6 and 16 percent at math level 4 for a total of 22.3 percent of the BA degrees in math-related fields, while only half

that percent of whites (12.8 percent) received BA degrees in math-related fields.

Although the proportions and actual numbers of women who graduated from college by 1976 is smaller for the two racial minority groups, a greater percentage of Hispanic and black women graduate in the math-related fields of study. The attainment of these higher level skills should help these groups overcome their double minority handicap in the upper echelons of the labor force.

A more complete picture emerges from looking at Tables 8-10. In 1972, 37.2 percent of the Hispanic women planned to at least complete college. In 1976, a more married group, 32.3 percent planned to graduate. Black women too, perhaps taking their present situation into account, revised their college graduation expectations from 49.6 percent (the highest of the three subgroups--also congruent with past research) downward to 36.2 percent, while white women moderated their expectations from 45.1 percent to 41.9 percent.

In 1976, Hispanics finished a four- or five-year university one-third as often as whites, while blacks were two-thirds as likely as whites to graduate from college. In addition, slightly more than half of the Hispanic women were married, although two-thirds did not have children. A different picture emerged for blacks of whom two-thirds were not married and slightly more than half did not have children. Whites followed the same pattern as the black women; slightly more than half were not married and more than three-fourths did not have children. These figures are consonant with other sources and seem to result from the individual cultural norms.

If a woman is not in a high school academic program and additionally taking math and science classes, she will be even less able to enter math-related college fields of study. This in turn will further disadvantage her in competition within the labor market. Unfortunately, only 25 percent of the Hispanic and black women and one-half of the white women were enrolled in the academic high school curriculum program. Contributing even more to this situation are the data that show between 75 percent and 80 percent of the women stopped taking math after four semesters and even more stopped taking science after two years (91.3 percent Hispanics, 85.3 percent blacks, and 81.0 percent whites).

The average math test scores also revealed differences. On the standardized math SAT and ACT tests as well as the math ability test, whites scored measurably higher (51.0, 478, and 14.5) followed by Hispanics (43.0, 371, and 14.5) and then blacks (41.4, 359, and 12.4), respectively.

In order to determine which factors have the most important associations with math-related attainment as defined by the eight math levels of the field of study variables, correlational analyses were conducted. In a future study* these relationships will be used to assess which independent variables might be predictive of the dependent math-related attainment variables.

A number of varying patterns can be discerned from Tables 11-13, starting with noting that 16 correlation coefficients had a magnitude of .4 or greater for Hispanic women, while only 3 and 1 correlations were greater or equal to .4 for black and white women, respectively. It also appears that the patterns for the two racial minority groups of women are

* The first author is presently completing her dissertation which incorporates this paper as well as the future study mentioned.

not more similar to each other than to the white women's patterns of association.

Hispanic Women

For Hispanics, 1972 educational expectation correlates most highly with the math-related field of study variables. This is noteworthy because the Hispanic women have the lowest educational expectation of the three groups of women.

High school programs and number of semesters of math and of science are also positively related to the field of study variables. Furthermore, as the years away from high school increase, the strength of the relationship increases too, with one exception (1976 college major and number of semesters of science).

The two self-concept measures and the sex-role orientation were also moderate correlates.

The Hispanic group is the only one in which the background variables are influential. In particular, father's education is related to many of the field of study variables, possibly reflecting the dominant role of the father in Hispanic families.

The significant others' college influences variables are related in some cases. Most interesting is the negative association that teachers/counselors are perceived to have in regard to the dependent variables. Perhaps the schools are not helping these Hispanic women prepare for a math-oriented college course of action.

Black Women

In contrast to Hispanic women, math ability was associated with all the math-related dependent variables for black women and the background

variables (with one exception), sex-role orientation, and self-concept measures were not associated with any degree of magnitude.

The strongest relationships with the dependent variables occurred with the number of semesters of math and science; high school program, percentile class rank and educational expectation also showed good associations with the math field of studies.

For blacks, having children was negatively related to four of the dependent variables--an important finding because black women had children twice as often as whites and one and one-half times more than Hispanics. Perhaps in U.S. society, blacks have children earlier so that it becomes a relevant and negative factor earlier in their career pursuits than it does for Hispanics and whites.

White Women

The correlational patterns for white women are similar to those for blacks in many ways; the four background variables are not importantly related to the math field of studies variables and neither are the marriage, self-concept, sex-role orientation, or teacher/counselor perceived college influence variables.

The white patterns follow those of the Hispanic in the dependent variables' stable and strong relationship with educational expectation and the lack of association with the children factor.

The sample size for the white women is sufficiently greater for the other two subgroups that although there is only one relationship with a magnitude greater than .40--that between educational expectations and the 1972 math-related field of study--the other correlations show considerable strength. In fact, math ability, number of semesters of math and science,

percentile class rank, parental college influence, as well as educational expectation demonstrate sizeable and important associations with the dependent variables.

Conclusions

Based on a review of the literature, we chose variables which we thought would be related to the math-related attainment dependent variables--the field of study variables.

Some variables are important for one group only. For example, two of the background variables, the two self-concept measures, and sex-role orientation show significant correlations for Hispanic women; the children family status variable exhibits a significant (negative) relationship for black women only.

Some of these factors--educational expectation, and the number of high school semesters of math and of science seem to be influential for all three groups of women. These are all "high school" variables. Many can, to varying degrees, be manipulated so as to increase the chances for women to pursue careers in higher status math-related fields by obtaining sufficient college mathematics training.

The next phase of this research will be to test the path models for each group using these dependent variables, with some modification. It would not be surprising to find that for each racial women's group, different factors will be most influential and that in order to encourage women to participate in advanced mathematics, school and social-psychological factors must be considered separately for white, black and Hispanic women.

Table 1. Aspects Covered in the Mathematics Studies

| Name of Recent Researchers | Year | Aspects Covered | | | | |
|---|---|---|---|---|---|---|
| | | Sex Differences | Women Only | Race Subgroups | Longi-tudinal | National Samples |
| Armstrong | 1980 | | X | | | X |
| Boswell | 1979 | | X | | | |
| Brush | 1979 | | X | | X | |
| Fennema & Sherman | 1977, 1978 | X<br>X | X | | | |
| Fox | 1979 | | X | | | |
| Houston | 1979 | X | | X | | |
| Parsons | 1979 | X | | | X | |
| Peng & Jaffe | 1979 | X | | | X | X |
| Stallings | 1979 | | X | | | |
| Steel & Wise | 1979 | X | | | X | X |
| Wise | 1979 | X | | | X | X |

Table 2. Weighted Percentages* for Women's Math Levels of Expected College Field of Study

| | Hispanics (n=143) | Blacks (n=429) | Whites (n=3172) |
|---|---|---|---|
| 2 | 8.1 | 6.8 | 9.4 |
| 3 | 84.7 | 79.1 | 79.6 |
| 4 | 4.0 | 8.2 | 6.8 |
| 5 | 2.9 | 4.3 | 2.5 |
| 6 | 0.3 | 1.6 | 1.7 |

* May not total to 100 percent due to rounding

Table 3. Weighted Percentages* for Women's Math Levels of 1972 College Field of Study

| | Hispanics (n=149) | Blacks (n=527) | Whites (n=3089) |
|---|---|---|---|
| 1 | 20.8 | 14.9 | 11.9 |
| 2 | 22.5 | 19.1 | 26.0 |
| 3 | 48.8 | 54.9 | 51.8 |
| 4 | 5.9 | 7.8 | 7.5 |
| 5 | 1.7 | 2.0 | 1.3 |
| 6 | 0.3 | 1.2 | 1.5 |

* May not total to 100 percent due to rounding

Table 4. Weighted Percentages* for Women's Math Levels of 1976 College Field of Study

| | Hispanics (n=74) | Blacks (n=255) | Whites (n=1230) |
|---|---|---|---|
| 1 | 8.4 | 4.3 | 4.8 |
| 2 | 19.6 | 16.9 | 18.5 |
| 3 | 62.0 | 71.6 | 63.1 |
| 4 | 8.8 | 6.4 | 9.9 |
| 5 | 1.1 | 0.6 | 3.3 |
| 6 | -- | 0.3 | 0.5 |

* May not total to 100 percent due to rounding

Table 5. Weighted Percentages* for Women's Math Levels of Field of Study of B.A. Degree

| | Hispanics (n=12) | Blacks (n=105) | Whites (n=973) |
|---|---|---|---|
| 2 | -- | 7.3 | 10.1 |
| 3 | 74.9 | 70.4 | 77.2 |
| 4 | 25.1 | 16.0 | 8.8 |
| 5 | -- | 4.6 | 2.3 |
| 6 | -- | 1.7 | 1.7 |

*May not total to 100 percent due to rounding

Table 6. Weighted Percentages* for Women's Math Levels of Expected Graduate School Field of Study

| | Hispanics (n=9) | Blacks (n=39) | Whites (n=297) |
|---|---|---|---|
| 2 | -- | 8.5 | 9.3 |
| 3 | 39.1 | 67.1 | 65.6 |
| 4 | 39.4 | 27.7 | 19.6 |
| 5 | 21.5 | 2.7 | 4.2 |
| 6 | -- | -- | 1.4 |

* May not total to 100 percent due to rounding

Table 7. Weighted Percentages* for Women in Math-related (Math Levels 4-6) Field of Study Variables

| | Hispanics | Blacks | Whites |
|---|---|---|---|
| math level exp. coll. major | 7.2 | 14.1 | 11.0 |
| math level 1972 coll. maj. | 7.9 | 11.0 | 10.3 |
| math level 1976 coll. maj. | 9.9 | 7.3 | 13.7 |
| math level, field of B.A. | 25.1 | 22.3 | 12.8 |
| math level expected grad. school major | 60.9 | 30.4 | 25.2 |

* May not total to 100 percent due to rounding

Table 8. Weighted Means by Subgroup

| | Hispanics | Blacks | Whites |
|---|---|---|---|
| math level expected coll. maj. | 3.0 | 3.2 | 3.1 |
| math level 1972 coll. maj. | 2.4 | 2.7 | 2.6 |
| math level 1973 coll. maj. | 2.5 | 2.7 | 2.7 |
| math level 1974 coll. maj. | 2.7 | 3.0 | 2.9 |
| math level 1975 coll. maj. | 2.9 | 3.0 | 2.9 |
| math level 1976 coll. maj. | 2.7 | 2.8 | 2.9 |
| math level, field of B.A. | 3.3 | 3.2 | 3.1 |
| math level expected grad. schl. | 3.8 | 3.2 | 3.2 |
| math level dad's occ. | 2.1 | 2.0 | 2.3 |
| mom's occupation | .23 | .39 | .48 |
| mom's education | 1.5 | 1.8 | 2.2 |
| dad's education | 1.7 | 1.7 | 2.4 |
| math ability | 43.0 | 41.4 | 51.0 |
| math SAT score | 371 | 359 | 478 |
| math ACT score | 14.5 | 12.4 | 19.0 |
| no. semesters h.s. math | 3.2 | 3.5 | 3.5 |
| no. semesters h.s. science | 2.8 | 3.2 | 3.3 |
| academic h.s. program | .24 | .27 | .47 |
| percentile class rank | 51.0 | 49.7 | 60.3 |
| academic self-concept | 3.9 | 4.0 | 4.1 |
| psychosocial self-concept | 2.1 | 2.0 | 2.1 |
| parental perceived coll. inf. | 2.3 | 2.3 | 2.3 |
| tchr/counslr. perceived coll. inf. | .72 | .75 | .65 |
| peers perceived coll. inf. | .56 | .52 | .60 |
| educational expect. (Base Yr.) | 3.8 | 4.1 | 3.9 |
| occupational expect. Base Yr.) | .93 | .79 | 1.2 |
| sex-role orientation | 2.7 | 2.7 | 2.7 |
| marriage | .55 | .33 | .49 |
| children | .36 | .47 | .24 |

TABLE 9

Table 9. Weighted Percentages* of Selected 1972 Independent Variables

| Independent Variables | Responses | Hispanics | | Blacks | | Whites | |
|---|---|---|---|---|---|---|---|
| | | Math | Science | Math | Science | Math | Science |
| Number of Semesters of Math and Science | 0 | 6.5 | 5.2 | 2.2 | 3.1 | 4.9 | 3.0 |
| | 1 | 3.6 | 3.2 | 1.3 | 2.1 | 1.8 | 1.3 |
| | 2 | 37.9 | 51.7 | 38.3 | 45.8 | 34.3 | 43.1 |
| | 3 | 4.6 | 3.9 | 3.6 | 3.4 | 2.7 | 3.0 |
| | 4 | 30.7 | 27.2 | 33.5 | 30.9 | 30.6 | 30.5 |
| | 5 | 3.3 | 0.9 | 3.2 | 1.1 | 2.5 | 1.7 |
| | 6 | 10.0 | 5.9 | 13.4 | 11.2 | 19.4 | 13.9 |
| | 7 | 1.0 | 0.8 | 0.4 | 0.4 | 0.8 | 0.6 |
| | 8 | 2.4 | 1.2 | 3.9 | 1.9 | 2.9 | 2.3 |
| | 9 or more | -- | | 0.2 | 0.1 | 0.1 | 0.4 |
| High School Program | academic | 25.6 | | 28.4 | | 49.3 | |
| | otherwise | 74.4 | | 71.6 | | 50.7 | |
| Educational Expectations (BY) | less than h.s. grad. | 4.0 | | 3.1 | | 1.8 | |
| | grad. h.s. | 14.0 | | 11.3 | | 20.7 | |
| | some voc/ tech. | 25.9 | | 25.1 | | 18.0 | |
| | some acad. coll. | 18.9 | | 10.9 | | 14.3 | |
| | finished 4 yr. coll. | 30.2 | | 35.4 | | 36.6 | |
| | grad. or prof. school | 7.0 | | 14.2 | | 8.5 | |

* May not total to 100 percent due to rounding

Table 10. Weighted Percentages* of Selected 1976 Independent Variables

| Independent Variables | Responses | Hispanics | Blacks | Whites |
|---|---|---|---|---|
| Married | yes | 55.0 | 33.0 | 48.8 |
| | no | 45.0 | 67.0 | 51.2 |
| Children | yes | 36.5 | 46.9 | 24.0 |
| | no | 63.5 | 53.1 | 76.0 |
| Educational Attainment (1976) | grad. h.s. | 4.2 | 37.9 | 38.0 |
| | less than 2 yrs. voc/tech. | 13.9 | 18.1 | 11.4 |
| | more than 2 yrs. voc/tech. | 2.4 | 2.2 | 3.2 |
| | less than 2 yrs. coll. | 17.8 | 14.4 | 13.1 |
| | more than 2 yrs. coll. | 15.8 | 16.1 | 16.8 |
| | finished 4 yr. coll. or more | 5.9 | 11.6 | 17.4 |
| Educational Expectations (1976) | grad. h.s. | 19.8 | 11.5 | 22.2 |
| | less than 2 yrs. voc/tech. | 18.3 | 13.3 | 12.5 |
| | more than 2 yrs. voc/tech. | 5.9 | 11.4 | 5.3 |
| | less than 2 yrs. coll. | 9.6 | 4.8 | 6.4 |
| | more than 2 yrs. coll. | 14.1 | 13.0 | 11.6 |
| | finished 4 yr. coll. | 17.1 | 21.0 | 19.8 |
| | received master's | 11.5 | 18.5 | 17.7 |
| | received Ph.D. or prof. degree | 3.7 | 6.7 | 4.4 |

* May not total to 100 percent due to rounding

Table 11. Significant* Pairwise-deletion+ Weighted Correlation Coefficients for Math-related Dependent Variables and the Independent Variables for Hispanic Women

| | Dependent Variables | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Math of expected college major | Math of 1972 college major | Math of 1973 college major | Math of 1974 college major | Math of 1975 college major | Math of 1976 college major | Math of B.A. college degree | Expecte grad. school major |
| dad's occ. math level | | | | | | | .67 (9) | |
| mom's occ. | | | | | | | | |
| mom's educ. | | .20 (148) | | .29 (99) | | | | |
| dad's educ. | .22 (141) | .31 (148) | .21 (131) | | .28 (73) | | .58 (12) | |
| math ability | | | .26 (122) | | | | | |
| no. semes. math | | .25 (147) | .27 (129) | .29 (99) | .36 (72) | .46 (73) | | |
| so. semes. science | | .20 (145) | .21 (127) | .33 (97) | .44 (71) | .41 (74) | .58 (12) | .75 (9) |
| h.s. program | | | .29 (127) | .28 (95) | .38 (74) | .32 (73) | | |
| percentile class rank | | | .24 (116) | | | .29 (67) | | |
| academic self-concept | | | .36 (131) | | .32 (74) | .44 (74) | | |
| psychosocial self-concept | | | | | | -.25 (74) | | -.72 (9) |
| parental coll. influence | | | .38 (92) | | | .29 (57) | | |
| tchr/counselor coll. influ. | | -.28 (149) | | | | | | -.77 (9) |
| peer college influence | | .35 (144) | | | | | | |
| educational expectation | | .41 (102) | .65 (86) | .47 (66) | .29 (49) | .51 (44) | .93 (10) | .82 (6) |
| occupational expectation | | | .25 (131) | | .36 (74) | .35 (74) | | |
| sex-role orientation | | .20 (124) | .25 (108) | .23 (82) | | .28 (70) | | |
| marriage | | | -.21 (115) | | | | | |
| children | | | | | | | | |

* $p \leq .05$
+ sample size in parentheses

Table 12. Significant* Pairwise-deletion+ Weighted Correlation Coefficients for Math-related Dependent Variables and the Independent Variables for Black Women

| | Dependent Variables | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Math of expected college major | Math of 1972 college major | Math of 1973 college major | Math of 1974 college major | Math of 1975 college major | Math of 1976 college major | Math of B.A. college degree | Expecte grad. school major |
| dad's occ. math level | | | | | | | -.30 (83) | |
| mom's occ. | | | | | | | | |
| mom's educ. | | | | | | | | |
| dad's educ. | | | | | | | | |
| math ability | .26 (400) | .34 (494) | .35 (444) | .27 (348) | .33 (315) | .23 (231) | .30 (100) | .39 (37) |
| no. semes. math | .20 (409) | .24 (491) | .25 (449) | .22 (357) | | .21 (244) | | .43 (38) |
| so. semes. science | .26 (409) | .25 (499) | .20 (453) | .21 (358) | | | .21 (102) | |
| h.s. program | | .31 (518) | .33 (365) | .24 (365) | .21 (331) | | | |
| percentile class rank | | .23 (455) | .26 (397) | .26 (326) | | | .31 (96) | .40 (38) |
| academic self-concept | | | | | | | | |
| psychosocial self-concept | | | | | | | | |
| parental coll. influence | | .27 (314) | .25 (289) | | | | | |
| tchr/counselor coll. influ. | | | | | | | | |
| peer college influence | | | | | | | | |
| educational expectation | | .30 (321) | .26 (301) | .21 (251) | | | | |
| occupational expectation | | | | | | | | |
| sex-role orientation | | | | | | | | |
| marriage | | | | | | | | |
| children | | | | -.24 (351) | -.25 (336) | -.24 (253) | | -.40 (38) |

* $p \leq .05$
\+ sample size in parentheses

Table 13. Significant* Pairwise-deletion+ Weighted Correlation Coefficients for Math-related Dependent Variables and the Independent Variables for White Women

| | Dependent Variables | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Math of expected college major | Math of 1972 college major | Math of 1973 college major | Math of 1974 college major | Math of 1975 college major | Math of 1976 college major | Math of B.A. college degree | Expected grad. school major |
| dad's occ. math level | | | | | | | | |
| mom's occ. | | | | | | | | |
| mom's educ. | | | | | | | | |
| dad's educ. | | | | | | | | |
| math ability | | .31 (2943) | .26 (2490) | .24 (2144) | .25 (1842) | .31 (1183) | | .28 (281) |
| no. semes. math | | .26 (2976) | .22 (2507) | .21 (2168) | .20 (1856) | .21 (1182) | | |
| so. semes. science | .23 (3056) | .26 (2968) | | .22 (2162) | | .21 (1186) | .22 (951) | .27 (290) |
| h.s. program | | .32 (3050) | .23 (2573) | | | .26 (1218) | | |
| percentile class rank | | .27 (2912) | .22 (2463) | .23 (2102) | .24 (1808) | .24 (1147) | | |
| academic self-concept | | | | | | | | |
| psychosocial self-concept | | | | | | | | |
| parental coll. influence | | .34 (2631) | .24 (2244) | | .20 (1650) | .28 (1007) | | |
| tchr/counselor coll. influ. | | | | | | | | |
| peer college influence | | .20 (3032) | | | | | | |
| educational expectation | | .42 (2666) | .33 (2276) | .28 (1977) | .24 (1687) | .28 (1066) | | .27 (279) |
| occupational expectation | | .22 (3089) | | | | | | |
| sex-role orientation | | | | | | | | |
| marriage | | | | | | | | |
| children | | | | | | | | |

* $p \leq .05$
+ sample size in parentheses

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